



Module Specification

Operating Systems

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Part 1: Information

Module title: UFCFWK-15-2Operating Systems

Module code: UFCFWK-15-2

Level: Level 5

For implementation from: 2022-23

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Frenchay Campus, The British College Nepal, Villa College

Field: Computer Science and Creative Technologies

Module type: Standard

Pre-requisites: Computer and Network Systems 2022-23

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: See Learning Outcomes.

Outline syllabus: The syllabus includes:

Operating System Organization models and structures

History and implications of using Open Source code in operating systems. Licensing issues and their legal implications.

Process and Object Management kernel services, interrupt handlers, scheduling. Inter-process Communication event handling, message passing, synchronous/asynchronous, shared memory.

Concurrency and Synchronization semaphores, critical regions, monitors, message passing, multi-threaded processes.

Memory Management Organization algorithms and policies, Virtual Memory Management.

Security Models for secure computing, access control, capability based systems, access control lists.

Virtualization. History of VMs. Variety of virtualization – full, partial, para. Emulators, simulators and virtualization. VM in languages – Java VM.

I/O Management Device driver design, Buffering and interrupt handling. File and Persistent Object Management File organization, directories and naming, index nodes, disk block management.

Network and distributed file systems Protection and Security Models for secure computing, access control, capability based systems, access control lists.

Embedded and mobile OS. Background to embedded and mobile os. Hardware and software requirements for embedded/mobile. Embedded/mobile OS.

Part 3: Teaching and learning methods

Teaching and learning methods: Laboratory exercises will allow the student to gain familiarisation with the tools and techniques required for the implementation and verification of operating systems.

Students will be expected to demonstrate self-direction and originality in their learning which will be facilitated through student directed tutorials.

Scheduled learning: in the form of tutorials, demonstrations and practical classes will comprise 1/3 of the total study time for this module.

Independent learning: will constitute the remaining study time with an expectation that approximately 46 hours will be spent on self-directed study, a further 40 hours in support of the coursework and 16 hours preparation for the presentation.

Contact Hours:

Activity:

Contact: 48 hours

Assimilation and skill development: 42 hours

Undertaking coursework: 40 hours

Exam preparation: 20 hours

Total: 150 hours

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Show a detailed knowledge and understanding of the design, structure and implementation of modern operating systems (OS) as well as the data structures and interfaces of a OS

MO2 Write small utility programs, in both script and compiler level languages, that interface to the system primitives

MO3 Build and modify a OS, with particular application to user/system interface and memory sub-systems

MO4 Understand the security problems and solutions in an OS

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 102 hours

Face-to-face learning = 48 hours

Total = 150

Reading list: The reading list for this module can be accessed at [readinglists.uwe.ac.uk](https://uwe.rl.talis.com/modules/ufcfwk-15-2.html) via the following link <https://uwe.rl.talis.com/modules/ufcfwk-15-2.html>

Part 4: Assessment

Assessment strategy: Summative assessment is achieved by creating an innovative solution to a design problem which will be assessed as an in-session presentation and demonstration of the developed solution. The presentation will have group and individual elements which will be clearly outlined in the assessment brief and marking scheme.

The resit assessment will involve an individual presentation based on a new problem.

Assessment components:

Presentation - Component A (First Sit)

Description: The means of assessment will be an in-class presentation and demonstration of project.

The 20 minute presentation and demonstration session consisting of:

- Group presentation discussing the PintOS architecture and details of the development with individual contributions demonstrating
 - o The system call selected by each student for exploitation
 - o Rationale(s) for choosing it (i.e., Why?)

- o Details of exploitation (How, what, etc)
- o Countermeasures

Weighting: 100 %

Final assessment: Yes

Group work: Yes

Learning outcomes tested: MO1, MO2, MO3, MO4

Presentation - Component A (Resit)

Description: The means of assessment will be a presentation and demonstration of project.

The 20 minute presentation and demonstration session consisting of:

- Individual presentation discussing the PintOS architecture and details of the development

- o The system call selected by each student for exploitation
- o Rationale(s) for choosing it (i.e., Why?)
- o Details of exploitation (How, what, etc)
- o Countermeasures

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Computer Science [Sep][FT][Villa][3yrs] BSc (Hons) 2021-22

Computer Science [Jan][FT][Villa][3yrs] BSc (Hons) 2021-22

Computer Science [May][FT][Villa][3yrs] BSc (Hons) 2021-22

Cyber Security and Digital Forensics [Sep][FT][Frenchay][3yrs] BSc (Hons) 2021-22

Cyber Security and Digital Forensics [Jan][FT][NepalBrit][3yrs] BSc (Hons) 2021-22

Computer Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2021-22

Computing [Sep][SW][Frenchay][4yrs] - Not Running BSc (Hons) 2021-22

Computing [Sep][FT][Frenchay][3yrs] - Not Running BSc (Hons) 2021-22

Cyber Security and Digital Forensics [Sep][SW][Frenchay][4yrs] BSc (Hons) 2021-22

Forensic Computing and Security {Dual} [Mar][FT][Taylors][3yrs] - Not Running BSc (Hons) 2021-22

Forensic Computing and Security {Dual} [Aug][FT][Taylors][3yrs] - Not Running BSc (Hons) 2021-22

Computing {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2020-21

Computing {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Computer Science {Foundation}[Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Computer Science {Foundation}[Sep][SW][Frenchay][5yrs] BSc (Hons) 2020-21

Forensic Computing and Security {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Forensic Computing and Security {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2020-21

Cyber Security and Digital Forensics {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2020-21

Cyber Security and Digital Forensics {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2020-21

Computer Science [Sep][FT][Villa][3yrs] - Not Running BSc (Hons) 2021-22

Computer Science [May][FT][Villa][3yrs] - Not Running BSc (Hons) 2021-22

Computer Science [Jan][FT][Villa][3yrs] - Not Running BSc (Hons) 2021-22

Computer Science {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2020-21

Computer Science {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2020-21

Computer Science [Sep][FT][Frenchay][3yrs] - Not Running BSc (Hons) 2020-21

Computer Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2019-20

Computer Science [Sep][SW][Frenchay][4yrs] BSc (Hons) 2019-20

Computer Science {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2018-19